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June 28, 2019

Marlene Dortch, Secretary  
Federal Communications Commission  
445 Street, SW  
Washington, DC 20554

*via ECFS*

**Re: Notice of Oral *ex Parte* Presentations: IB Docket No. 18-86 (In the  
Matter of Streamlining Licensing Procedures for Small Satellites)**

Dear Ms. Dortch:

On June 26, 2019, Andrew Roy and Gregory Baker of Aviation Spectrum Resources, Inc. ("ASRI"); Edward A. Yorkgitis, Jr., of Kelley, Drye & Warren, LLP, counsel for ASRI; Ramsey Abid of Collins Aerospace; and Christopher Sellen of SITAONAIR (by telephone) (collectively, the "Aviation Representatives") met with Aaron Goldberger, acting wireless and international advisor to Chairman Ajit Pai, and separately with Erin McGrath, wireless, public safety, and international advisor to Commissioner Michael O'Rielly, and Christopher McGillen, legal intern in Commissioner O'Rielly's office. The purpose of the meetings was to discuss the aviation industry's current uses of the band 136-137 MHz for critical VHF data communications in the United States and internationally. The Aviation Representatives highlighted the aviation industry's concerns that any actions facilitating small satellite use in the 137-138 MHz band be considered only if effective methods of mitigating interference to adjacent band aviation safety data communications are put in place both domestically and globally.

The Aviation Representatives described the increasing utilization of the 136-137 MHz band for the Very High Frequency Data Link Mode 2 ("VDLM2") system, which supports applications critical to aviation safety and efficiency of operations. VDLM2 is a digital, air-to-ground datalink technology providing connectivity for aircraft to send and receive Air Traffic Control ("ATC") and Airline Operational Control ("AOC") communications messages. VDLM2 is a core capability of the Federal Aviation Administration's ("FAA's") Data Comm program that provides Air Traffic Services ("ATS") such as Controller-Pilot Data Link Communications ("CPDLC") which supplements, and increasingly replaces, voice communications with digital text messages. The Aviation Representatives provided information on the extensive, and

**KELLEY DRYE & WARREN LLP**

Marlene Dortch, Secretary  
Federal Communications Commission  
June 28, 2019  
Page Two

growing, use of Data Comm program in the United States today, and the substantial benefits that Data Comm program provides to the public, as well as users of the National Airspace System ("NAS"), including improved efficiency, improved safety, reduction of flight delays, reduced CO2 emissions, and lower transportation costs. They also described the extent to which VDLM2 is deployed internationally and planned expansions both to improve domestic and worldwide VDLM2 coverage and to implement CPDLC services in countries outside the United States.

The Aviation Representatives explained that VDLM2 networks uses 136.975 MHz (136.9625-136.9875 MHz) for its Common Signaling Channel ("CSC"). This channel is designated globally in the International Civil Aviation Organization ("ICAO") Standards and Recommended Practices ("SARPS"), pursuant to decisions in international fora several decades ago and a standardized architecture defined globally by ICAO. The CSC is critical to the VDLM2 network, as it is the unique channel required to access other dedicated provider frequencies and is also the emergency fallback frequency should an aircraft lose coverage.

They explained that the Commission should carefully consider the potential for out-of-band emissions ("OOBE") from small satellites, raising the in-channel noise floor into the CSC, causing harmful interference to both ground and the aircraft stations using VDLM2. If a VDLM2 station experiences an elevated noise floor due to OOBE below 137 MHz, there will be gaps in coverage, and the serviceable range in which the aircraft can communicate through the datalink with air traffic control facilities and airline operational centers may be reduced, leading to delays or even outright failures in transmission of important ATC or AOC messages. Due to the concern that small satellite frequency assignments close to the band will cause harmful interference to the CSC, the Aviation Representatives urged the Commission to adopt a guard band of at least 25 kHz at the bottom of the 137-138 MHz band (i.e., at 137.000 to 137.025). Further, if small satellites' frequency oscillator drifts and other fault conditions are not properly regulated and monitored, the potential for harmful interference from OOBE emissions would increase. The Aviation Representatives indicated that this is of particular concern for experimental small satellites or those employing non-standard radio technologies, and requested that the Commission preclude operation of such small satellites below 137.175 MHz. The potential for aggregate interference from satellites is of particular concern if steps are not taken to protect the CSC.

The Aviation Representatives also noted that both aviation and satellites transmissions are international in nature in and around 137 MHz, which underscores the need for the Commission to consider any global implications. As of early this year, questions have arisen under Agenda Item 1.7 of the upcoming World Radiocommunication Conference regarding aviation protection below 137 MHz. The Aviation Representatives noted that there have been no approved adjacent band compatibility studies conducted within the relevant Working Parties of

**KELLEY DRYE & WARREN LLP**

Marlene Dortch, Secretary  
Federal Communications Commission  
June 28, 2019  
Page Three

the International Telecommunication Union Radiocommunication Sector ("ITU-R") to ensure that VDLM2 would not be impacted by regulation changes for small satellite usage of the 137-138 MHz band. The Aviation Representatives urged the Commission to support a U.S. position of "no change" and promoting the ICAO protection criteria until protection levels can be thoroughly agreed within the ITU-R.

A copy of the written presentation materials used in both meetings is attached.

Pursuant to Section 1.1206(b) of the Commission's rules, this letter is being filed electronically.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'E. Yorkgitis, Jr.', is written over the typed name.

Edward A. Yorkgitis, Jr.  
*Counsel for Aviation Spectrum Resources, Inc.*

EAY/am

Attachment

cc: Aaron Goldberger  
Erin McGrath  
Christopher McGillen



# Small Satellites and VHF Datalink Mode 2

Aviation Spectrum Resources, Inc. (ASRI)

Harris Corporation

Collins Aerospace

Société Internationale de Télécommunications Aéronautiques (SITAONAIR)

Prepared for Chairman Pai's Office and Commissioner O'Rielly's Office

June 26<sup>th</sup> 2019



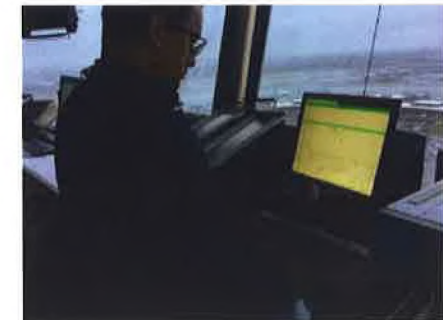
- Introductions
- VHF Data Link Mode 2 (VDLM2) System
- US Datalink Operations
- International VDLM2 Coverage
- Aviation Concerns with Small Satellites
  - WRC-19 Agenda Item 1.7
  - Docket 18-86
- Commission Actions to Protect Aviation

## VHF Data Link Mode 2 System

- VDLM2 is an internationally standardized air-ground datalink operated between 136-137 MHz
  - Supports safety and regulatory of flight messages
  - Equipped on majority of medium/large commercial aircraft for operational control messages
- United States is leading the world on implementation of Air Traffic Services over VDLM2
- ICAO specified common signaling frequency on 136.975 MHz worldwide
  - Required everywhere there is VDLM2 coverage
  - Initial route to log into network and emergency fallback frequency

## FAA Data Comm Program

- ➔ Provides data communications services between pilots and air traffic controllers, supplementing existing voice communications capabilities
- ➔ Provides a data link between ground automation systems and flight deck avionics for air traffic control (ATC) clearances, instructions, traffic flow management, and flight crew requests
- ➔ Controllers will be able to deliver instructions with a push of a button and without the need to utilize voice frequencies
- ➔ Enables the transmission of complex instructions that can be quickly and correctly loaded into an aircraft's flight management system, upon acceptance by the pilot
- ➔ Enables NextGen Initiatives and Trajectory-Based Operations



# Data Comm Metrics



**13 US Air  
Carriers**  
(Part 121)



**53 Non-US  
Air Carriers**  
(Part 129)



**1,600+  
Business Aviation  
Operators**  
(Parts 91, 91K, 135)



**62  
Airports**



**58  
Aircraft  
Types**



**Over 5,900  
Equipped  
Aircraft**



**7.8M CPDLC  
Messages Sent  
2018**



# Data Comm Tower Benefits 2018



**Improve re-routing around weather and congestion**



*Throughput/Efficiency*



531,000+ minutes of reduced delay



**Reduce Communication time between controllers & pilots**



*Controller Pilot/Efficiency*



641,000+ minutes of communication time saved



**Increase flexibility and accommodation of user requests**



*Environmental*



4.7M kgs of CO<sub>2</sub> emissions prevented



**Enable NextGen Initiatives & Trajectory-Based Operations**



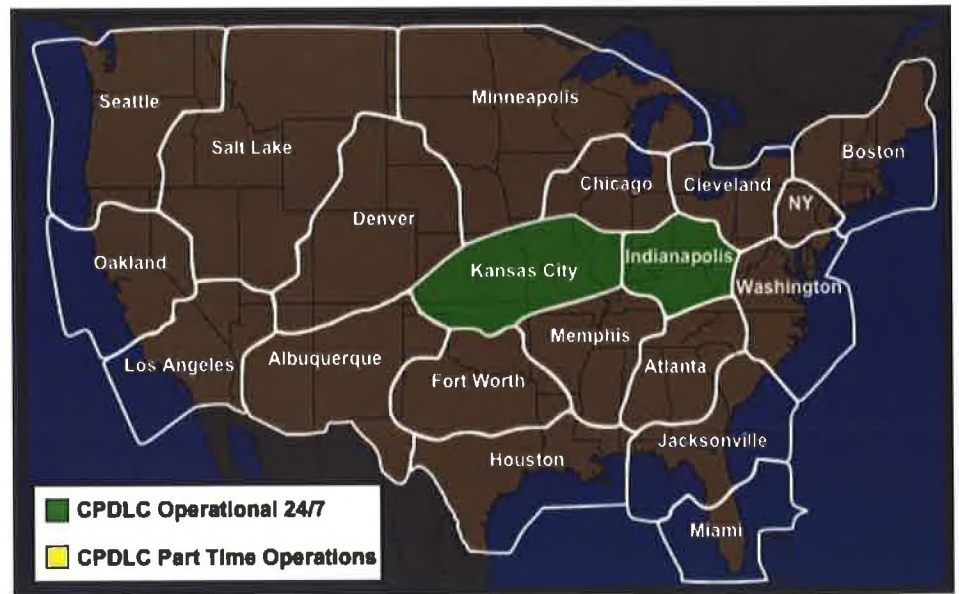
*Safety*



33,800+ readback errors avoided

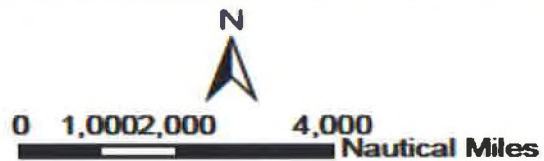
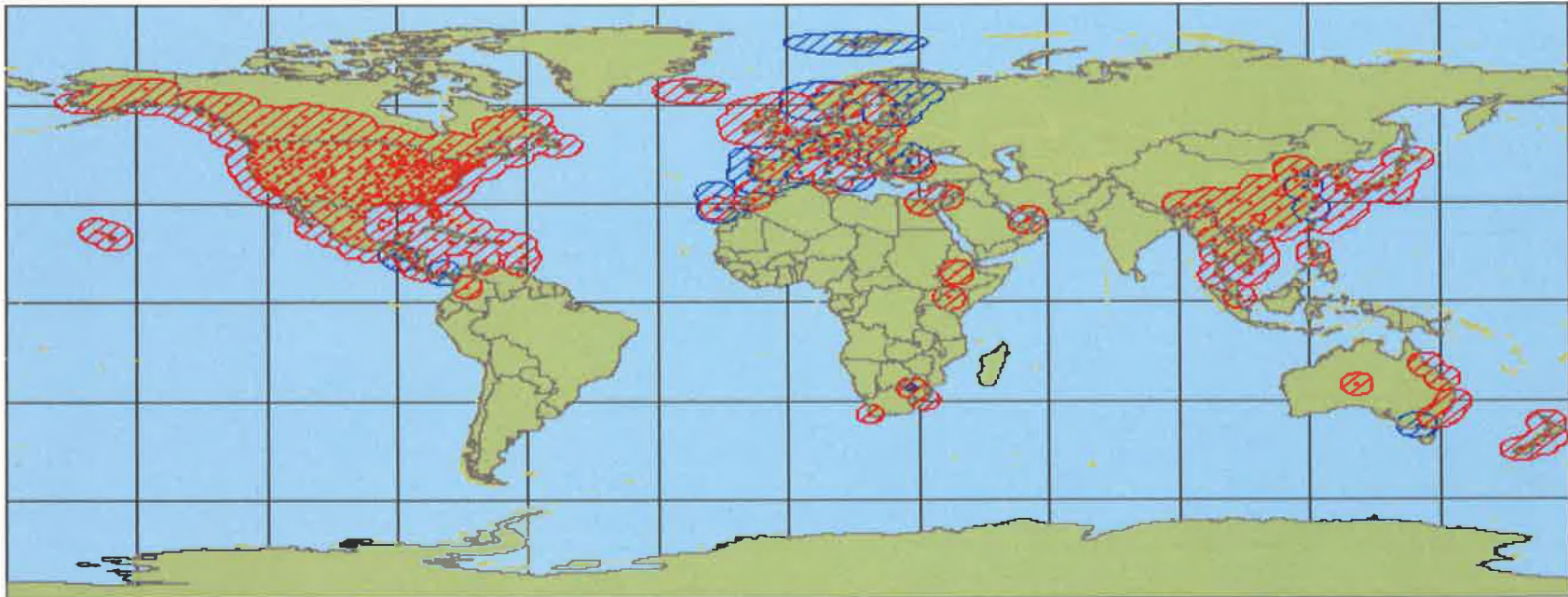
# Data Comm En Route

- En route services projected to deliver significantly more benefits than tower
- Air-ground network supports tower and en route services
- En route services currently in early operations
  - Kansas City & Indianapolis airspace
  - Expected national deployment by 2021





# WORLDVIEW: COLLINS VDLM2 COVERAGE



**Notes:**  
The map projection is Geographic and is for representation only. Not to scale.  
Terrain obstructions are not considered.

## Legend:



**Operational**



**Planned**

## GLOBALink VDL - World Operational and Planned Coverage

Drawn By:  
bsias

Filename:  
world\_planned\_vdl.mxd

Effective Date:  
March 23, 2018

**Rockwell  
Collins**  
Building trust every day

## SITAONAIR - Global VDL Coverage





- Aviation concerned about harmful interference from unwanted emissions by small satellites operations in 137-138 MHz into adjacent AM(R)S allocation impacting VDLM2
  - 136.975 MHz is essential for VDLM2 operations
  - Emergency fallback frequency, required everywhere there is VDL coverage
- No international agreement on protection levels
  - VDLM2 needs protection worldwide, values agreed in ICAO but not ITU-R
- Mitigations available for small satellites
  - Filtering, Guard band

## The Commission Should Ensure Protection of VDLM2

- Domestic rules and international agreements facilitating small satellites/non-geostationary short duration satellites use in the 137-138 MHz band should require effective methods of mitigating potential harmful interference to adjacent band aviation safety VHF data communications
- Domestically, as a first step, the Commission should adopt in its *Small Satellite* proceeding a guard band of at least one channel (25 kHz) at the bottom of the 137-138 MHz band (i.e., at 137.000 to 137.025 MHz)
  - The fault conditions of small satellites should be properly regulated and monitored
- Internationally, protection requires U.S. leadership
  - The Commission should support a U.S. position promoting ICAO protection criteria until protection levels can be thoroughly agreed within ITU-R
    - FAA studies submitted to ITU-R show harmful interference unless mitigations are in place



Questions?